

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
7 October 2004 (07.10.2004)

PCT

(10) International Publication Number
WO 2004/085708 A1

(51) International Patent Classification⁷:
C25C 1/02, C25D 17/00

C25B 1/00,

(74) Agent: KLEIN, Richard; Fay, Sharpe, Fagan, Minnich, & McKee, LLP, 1100 Superior Avenue, 7th Floor, Cleveland, OH 44114-2579 (US).

(21) International Application Number:

PCT/US2003/026012

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(22) International Filing Date: 21 August 2003 (21.08.2003)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

60/404,978

21 August 2002 (21.08.2002)

US

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(71) Applicant (*for all designated States except US*): BATTELLE MEMORIAL INSTITUTE [US/US]; 505 King Avenue, Columbus, OH 43201-2693 (US).

(72) Inventors; and

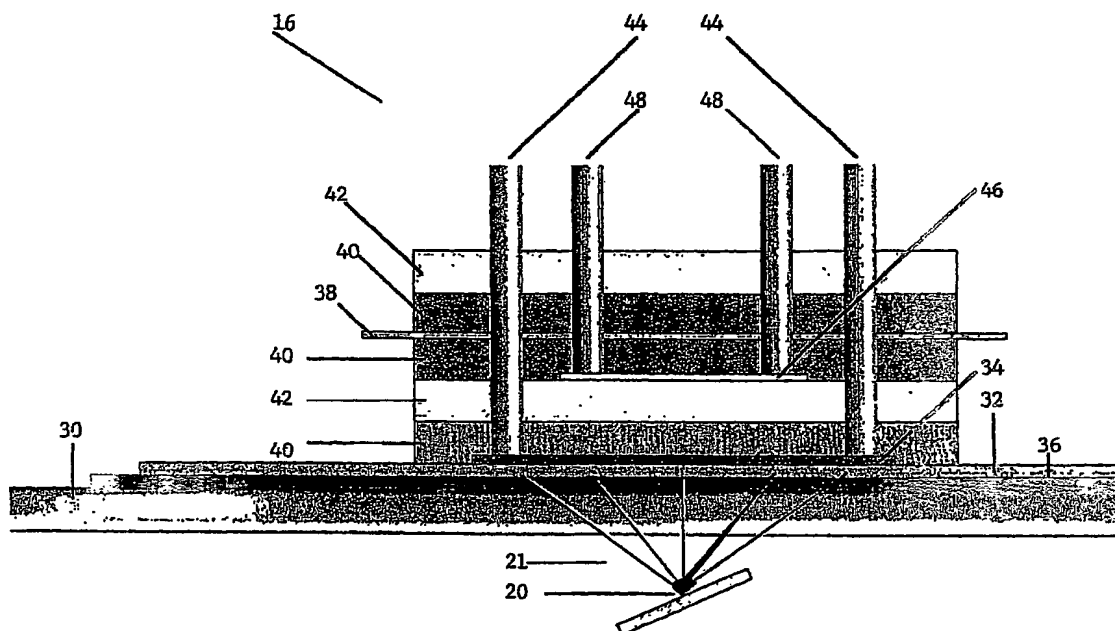
(75) Inventors/Applicants (*for US only*): MONZYK, Bruce [US/US]; 7460 Blaney Road, Delaware, OH 43051 (US). BURCKLE, Eric [US/US]; 2712 Quarry Lake Drive, Columbus, OH 43204 (US).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: PHOTOLYTIC OXYGENATOR WITH CARBON DIOXIDE AND/OR HYDROGEN SEPARATION AND FIXATION



(57) Abstract: Apparatus for oxygenating an enclosed space as well as removing carbon dioxide from the enclosed space. The apparatus comprises a photolytic cell (16) having an anode compartment with a photo-active surface having the ability to convert water to oxygen; a cathode compartment having the ability to convert carbon dioxide and hydrogen to a solid or liquid medium; and a light source (20) for providing light photons (21) to said photolytic cell and activating the photo-reactive surface.

BEST AVAILABLE COPY

WO 2004/085708 A1

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/26012

A. CLASSIFICATION OF SUBJECT MATTER IPC(7) : C25B 1/00; C25C 1/02; C25D 17/00 US CL : 204/242, 252, 263-266; 205/340, 628, 633, 637 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 204/242, 252, 263-266; 205/340, 628, 633, 637 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EAST: photo? same cell; light near3 activated; 204/\$.ccls. and photo? and carbon near3 dioxide		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4,466,869 A (AYERS) 21 August 1984 (21.08.1984, Figures 1, and columns 4-8.	1-3, 5, 13-14
A	US 4,478,699 A (HALMANN et al) 23 October 1984 (21.10.1984)	
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents:		
"A"	document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E"	earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed	
Date of the actual completion of the international search 15 June 2004 (15.06.2004)		Date of mailing of the international search report 30 JUN 2004
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230		Authorized officer Donald R. Valentine <i>J. White</i> Telephone No. 571-272-1222 <i>for</i>